

What is claimed is:

1. A process for producing 6 to 25 dpf carpet staple fiber comprising:
prewetting a undrawn yarn consisting essentially of
5 poly(trimethylene terephthalate) at a temperature less than about
45 °C; drawing the fiber under wet conditions at a temperature of
from about 45 °C to about 95 °C in a first stage to a length of about
30 to about 90 percent of its final length; drawing the fiber in a
second stage at a temperature from about 45 °C to about 98 °C
10 under wet conditions; crimping the drawn fiber; thermo-fixing the
crimped fiber in the presence of steam at a temperature from about
80 °C to about 100 °C; and drying the crimped fiber at 60 °C to 140
°C.
- 15 2. The process of claim 1, wherein said undrawn yarn is spun on
equipment having a spinneret capillary density of at least 2/cm² and
a quench zone shorter than about 16 feet.
- 20 3. The process of claim 1, wherein the undrawn yarn is spun at a
speed less than about 600 ypm.
- 25 4. The process of claim 1, wherein said prewetting and drawing are
carried out under water or under an aqueous solution of processing
finish.
5. The process of claim 1, wherein during said prewetting and
drawing, said yarn is in the form of a spun rope of less than about
300,000 denier/inch.
- 30 6. The process of claim 1, wherein in said first draw stage, the fiber is
drawn to a length from about 40 to about 70 percent of its final
length.

- 5 7. The process of claim 1, wherein in said first draw stage, the fiber is drawn to a length from about 50 to about 55 percent of its final length.
8. The process of claim 1, wherein said first draw stage is carried out at a temperature of about 80 °C or less.
- 10 9. The process of claim 1, wherein said first draw stage is carried out at a temperature of about 70 °C or less.
10. The process of claim 1, wherein said first draw stage is carried out at a temperature of about 60 °C or less.
- 15 11. The process of claim 1, wherein said first draw stage is carried out at a temperature of about 50 °C to about 55 °C.
12. The process of claim 1, wherein said second draw stage is carried out at a temperature of about 60 °C to about 80 °C.
- 20 13. The process of claim 1 wherein said thermo-fixing is carried out at a temperature of about 85 °C.
14. The process of claim 1 wherein said drawn yarn has a denier of 6 to 20 dpf.
- 25 15. The process of claim 1 wherein the crimped fiber is dried at a temperature from about 60 °C to about 100 °C.
- 30 16. A process for producing 1 to 6 dpf textile staple fiber comprising: prewetting a undrawn yarn consisting essentially of poly(trimethylene terephthalate) at a temperature less than about

- 45 °C; drawing the fiber under wet conditions at a temperature of from about 45 °C to about 95 °C in a first stage to a length of about 30 to about 90 percent of its final length; drawing the fiber in a second stage at a temperature from about 45 °C to about 98 °C under wet conditions; crimping the drawn fiber; thermo-fixing the crimped fiber in the presence of steam at a temperature from about 80 °C to about 100 °C; and drying the crimped fiber at 60 °C to 140 °C.
- 10 17. The process of claim 16, wherein said undrawn yarn is spun on equipment having a spinneret capillary density of at least about 8/cm² and a quench zone shorter than about 16 feet.
- 15 18. The process of claim 16 wherein said undrawn yarn is spun at a speed of 1300 ypm or less.
19. The process of claim 16 wherein said undrawn yarn is spun at a speed of 900 ypm or less.
- 20 20. The process of claim 16 wherein said prewetting and drawing are carried out under water or under an aqueous solution of processing finish.
- 25 21. The process of claim 16, wherein during said prewetting and drawing, said yarn is in the form of a spun rope of less than about 200,000 denier/inch.
- 30 22. The process of claim 16, wherein in said first draw stage, the fiber is drawn to a length from about 40 to about 90 percent of its final length.

23. The process of claim 16, wherein in said first draw stage, the fiber is drawn to a length from about 70 to about 90 percent of its final length.

5 24. The process of claim 16, wherein said first draw stage is carried out at a temperature of about 80 °C or less.

25. The process of claim 16, wherein said first draw stage is carried out at a temperature of about 70 °C or less.

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26. The process of claim 16, wherein said first draw stage is carried out at a temperature of about 60 °C or less.

15 27. The process of claim 16, wherein said first draw stage is carried out at a temperature of about 50 °C to about 55 °C.

28. The process of claim 16, wherein said second draw stage is carried out at a temperature of about 60 °C to about 80 °C.

20 29. The process of claim 16, wherein said thermo-fixing is carried out at a temperature of about 85 °C.

30. The process of claim 16, wherein said crimped fiber is dried at a temperature from about 60 °C to about 100 °C.

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31. A poly(trimethylene terephthalate) textile staple fiber of 1 to 6 dpf, prepared according to the process of claim 16, having a tenacity of at least about 3.0 gpd and a crimp take-up from about 15% to about 60%.

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32. A poly(trimethylene terephthalate) carpet staple fiber of 6 to 25 dpf, having a length of about 6 to 8 inches, a tenacity of at least about 2.2 gpd and a crimp take-up from about 10% to about 60%.
- 5 33. A 6 to 20 dpf poly(trimethylene terephthalate) staple fiber according to claim 32.
34. A poly(trimethylene terephthalate) fiber of claim 31 wherein said tenacity is 3.2 gpd or greater.
- 10 35. A poly(trimethylene terephthalate) fiber of claim 32 wherein said tenacity is 2.4 gpd or greater.
36. An apparel poly(trimethylene terephthalate) fiber of claim 31
- 15 wherein said crimp take-up is from about 30% to about 50%.
37. A carpet poly(trimethylene terephthalate) fiber of claim 32 wherein said crimp take-up is from about 15% to about 45%.
- 20 38. A yarn prepared from a fiber of claim 31.
39. A fabric made from a yarn of claim 38.
40. A textile or non-woven fabric of claim 39 further comprising one or
- 25 more fibers selected from cotton, rayon, PET, polypropylene, poly(lactic acid), nylon, acrylic, spandex, acetate, wool, and polybutylene terephthalate fibers.
41. A yarn prepared from a fiber of claim 32.
- 30 42. A carpet, rug or nonwoven fabric prepared from a fiber of claim 41.

43. A carpet, rug or nonwoven fabric of claim 42 further comprising one or more fibers selected from cotton, PET, polypropylene, poly(lactic acid), nylon, acrylic, wool, and polybutylene terephthalate fibers.
- 5 44. A fiber according to claim 31, comprising an anti-static agent.
45. A fiber according to claim 32, comprising an anti-static agent.